

**WHAT IS CLAIMED IS:**

1. A scalable, high-speed router for routing packets of information through an interconnected network, said router comprising:

- a) an interface means for receiving a packet containing header and data information;
- b) means for extracting routing information from said header of an arrived packet and generating a corresponding header packet for said arrived packet;
- c) memory means for storing said data information of said arrived packet at predetermined memory locations;
- d) means for processing said corresponding header packet to determine a route for said arrived packet, said processing means assigning packet forwarding information to said header packet;
- e) means for retrieving said data information from said predetermined memory locations and forwarding said data and header packet containing said packet forwarding information to said interface means for routing said packet to a further destination in accordance with said packet forwarding information, whereby said router processes said arrived packet in accordance with any quality of service requirements and flow specifications.

2. A scalable, high-speed router for routing packets as claimed in Claim 1, wherein said interface means includes scheduler means for forwarding said processed packets in accordance with

any quality of service requirements and flow specifications contained in said packet forward route information.

3. A scalable, high-speed router for routing packets as claimed in Claim 2, wherein said scheduler means includes means for implementing a weighted fair-queuing scheduling scheme.

4. A scalable, high-speed router for routing packets as claimed in Claim 1, wherein said header information contained in said header packet includes source and destination addresses and other routing parameters, said processing means further including filter means for determining propriety of said packet to be routed based on one or more of said source addresses, destination addresses and other routing parameters.

5. A scalable, high-speed router for routing packets as claimed in Claim 1, wherein said processing means further includes route look-up table means for determining from said created header packet to which destination address said arrived packet is to be forwarded.

6. A scalable, high-speed router for routing packets as claimed in Claim 5, wherein said processing means further includes flow identification means for receiving said packet record and assigning said arrived packet to a specific flow.

7. A scalable, high-speed router for routing packets as claimed in Claim 6, wherein said flow identification means forwards said packet header containing said packet forwarding information to said interface means for forwarding.

8. A scalable, high-speed router for routing packets as claimed in Claim 1, wherein said memory means is a high speed buffer memory buffer memory.

9. A scalable, high-speed router for routing packets as claimed in Claim 1, wherein said data information is stored as successive pages in said predetermined memory locations, said router further including link list manager means for tracking address locations for said successive pages containing said packet data information.

10. A scalable, high-speed router for routing packets as claimed in Claim 7, wherein said filtering means, route-table look-up means, and flow identification means are organized in a pipelined fashion that successively operate on said packet header and assign said packet forwarding information to said packet header.

11. A method for routing packets of information in an interconnected network containing header and data information, said method comprising the steps of:

- a) extracting routing information from said header of an arrived packet and generating a corresponding header packet for said arrived packet;
- b) storing said data information of said arrived packet at predetermined memory locations;
- c) processing said corresponding header packet to determine a route for said arrived packet and assigning packet forwarding information to said header packet;
- d) retrieving said data information from said predetermined memory locations and forwarding said data and header packet containing said packet forwarding information to a further destination in accordance with said packet forwarding information, whereby said router processes said arrived packet in accordance with any quality of service requirements and flow specifications.

12. A method for routing packets of information as claimed in Claim 11, wherein said header information contained in said header packet includes source and destination addresses and other routing parameters, said processing step c) further including the step e) of determining the propriety of said packet to be routed based on one or more of said source addresses, destination addresses and other routing parameters.

13. A method for routing packets of information as claimed in Claim 12, wherein said processing step further includes the step f) of determining from said created header packet a destination address to which said arrived packet is to be forwarded.

14. A method for routing packets of information as claimed in Claim 13, wherein said processing step further includes the step g) of assigning said arrived packet to a specific flow.

15. A method for routing packets of information as claimed in Claim 14, wherein said processing steps e), f), and g) are successively performed in a pipe-lined fashion.

~~16.~~ A network router comprising:

a) an interface for receiving and transmitting packets, each packet containing header and data information;

b) means for extracting routing information from an arrived packet and generating a packet record corresponding to the arrived packet, the packet record corresponding to the arrived packet comprising routing, processing, and switching information included in the arrived packet;

c) memory for storing data information of the arrived packet at predetermined memory locations;

d) a processor for processing the packet record corresponding to the arrived packet and determining a route and resource assignments for the arrived packet, the processor assigning packet forwarding information to the packet record corresponding to the arrived packet;

e) means for retrieving the data information of the arrived packet from the predetermined memory locations and assembling an outgoing packet corresponding to the arrived packet from the

data information of the arrived packet, the packet record corresponding to the arrived packet, and the packet forwarding information assigned to the packet record corresponding to the arrived packet;

f) means for queuing and scheduling for transmission the outgoing packet corresponding to the arrived packet, the queuing and scheduling being based on quality-of-service requirements of the arrived packet;

g) means for forwarding the outgoing packet corresponding to the arrived packet to the interface for transmitting the outgoing packet to a further destination in accordance with the forwarding information assigned to the packet record corresponding to the arrived packet.